Massachusetts Department of Public Health
Health Survey Program

Diabetes in Massachusetts, 2006-2008

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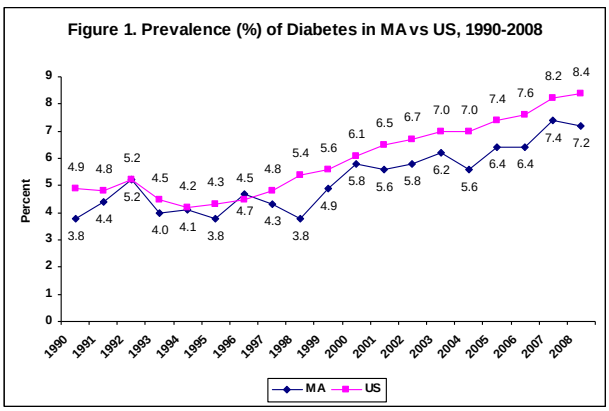
Diabetes Prevention and Control Program, Bureau of Community Health Access and Promotion

INTRODUCTION

With the dramatic increase in obesity as a primary driving force, the prevalence of diabetes has steadily increased around the world as well as in Massachusetts. In 2008, over 7% of adults in Massachusetts reported having been told by their doctor that they have diabetes. This represents almost a doubling in the number of people with diabetes since 1990 (Figure 1). As a result, diabetes is a leading cause of morbidity and mortality in the US [1], as well as a leading economic burden with an estimated $174 billion per year in medical fees and lost productivity[2].

While the impact of diabetes is not as severe in Massachusetts as it is in many other parts of the country, it is still one of the most important public health issues facing the Commonwealth; if current trends continue, the impact will get much worse. Fortunately, many people at high risk for diabetes can prevent or delay it with moderate weight loss and a healthier lifestyle [3]. Also, for those diagnosed with diabetes, quality care and self-management practices can prevent or delay complications from diabetes[4, 5].



Behavioral Risk Factor Surveillance System (BRFSS) to provide time trends of diabetes prevalence, types of diabetes, demographic characteristics of diabetics, risk factors and related health conditions for respondents with and without diabetes, and diabetes management and education. The data cover the years between 2006 and 2008, although the overall prevalence of diabetes is provided for a longer period of time to allow a presentation of the trend for diabetes. In addition, some variables are not available for all years and this is reflected in the report. More detailed information on Massachusetts BRFSS is available at http://www.mass.gov/dph/hsp .This report should act as a resource to policy makers, community organizations and individuals for increasing awareness about the impact diabetes has in Massachusetts.

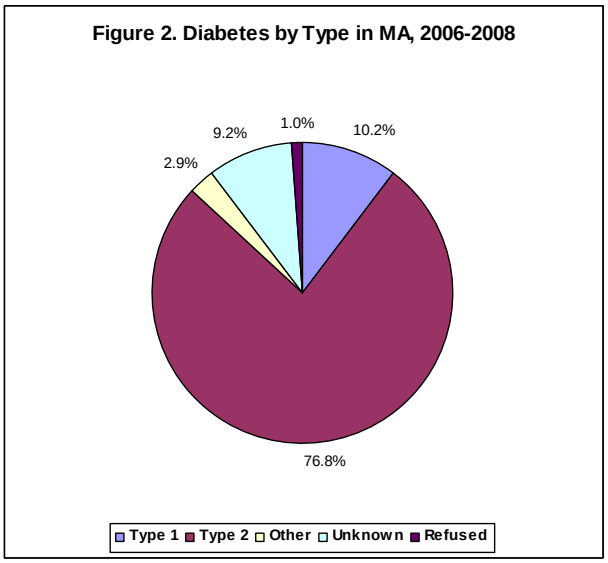
TERMS, DEFINITIONS AND METHODS USED IN THIS REPORT

The titles of the charts reflect a time period where the corresponding data are available. The terms *higher*, *lower*, *more likely*, *less likely* refer to statistically significant ($p \leq 0.05$) differences between groups of respondents.

Included in estimates of adults with diabetes are all respondents who self-reported that a doctor had ever told them they have diabetes, regardless of type. With the exception of the age-specific data presented in the demographics section, which are crude percentages, all data are age-adjusted to five age groups. The age-adjusted percentage is a weighted average of the age-specific proportions. The 2000 US population was used as a standard for the calculation.

WHAT IS DIABETES?

Diabetes is a disease in which the body is unable to properly use and store glucose (a form of sugar), resulting in higher than normal blood sugar. Insulin is a hormone used by the body to convert sugar, starches and other food into energy. Type 1 diabetes is caused by the inability of the pancreas to produce any insulin while type 2 diabetes is caused by the inability of the pancreas to produce enough insulin along with the inability of the body's cells to utilize insulin properly. Gestational diabetes is any degree of glucose intolerance with onset or first recognition during pregnancy[6]. In Massachusetts, most people with diabetes have type 2 diabetes (Figure 2).

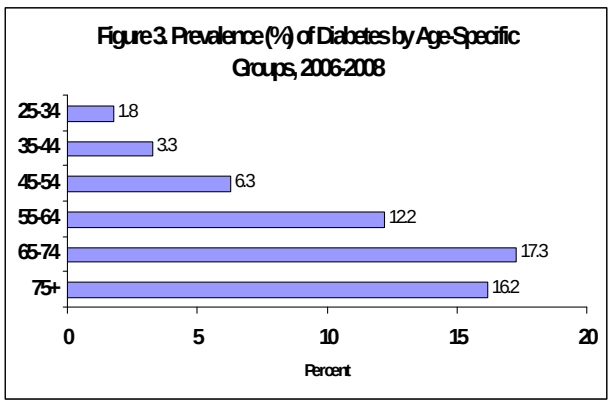


WHAT IS PRE-DIABETES?

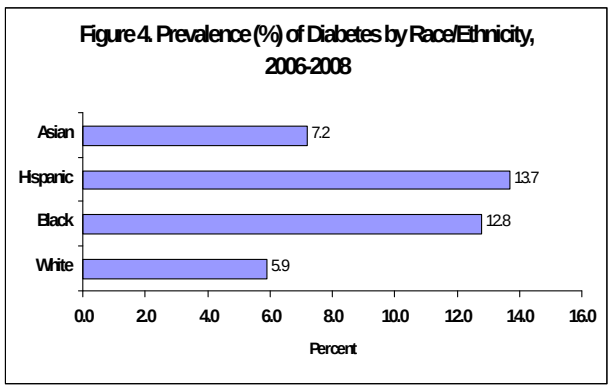
A person has pre-diabetes when their blood glucose levels are higher than normal but not high enough for a diagnosis of diabetes[7]. They are more likely to develop type 2 diabetes and cardiovascular disease compared to those without pre-diabetes. National surveys have estimated that as many as one in four adults have fasting blood sugar levels that are consistent with a diagnosis of pre-diabetes[8]. Unfortunately, many people are likely to be unaware of this condition. For example, from 2006 to 2008, an average of only 4.6% of adults in Massachusetts reported being told by their health care provider that they had pre-diabetes.

DEMOGRAPHICS

Diabetes is not distributed evenly throughout the population. For example, age-specific prevalence rates illustrate that the proportion of individuals with diabetes increases as age increased, peaking among 65-74 year olds and remaining high among those aged 75 and older (Figure 3).

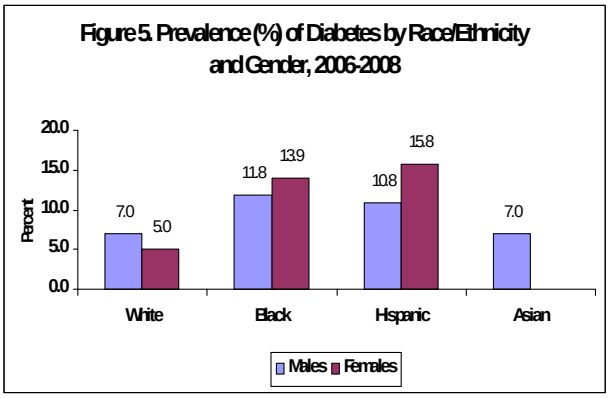


Across race and ethnicity groups, the prevalence of diabetes among both Hispanics and Black non-Hispanics is more than double that of White non-Hispanics. The prevalence among Asian non-Hispanics is also higher than among Whites but not significantly so (Figure 4).

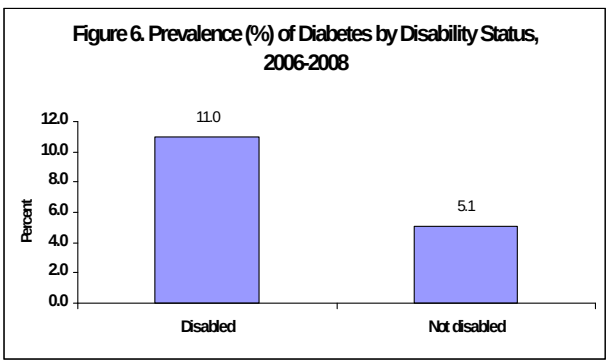


Overall, Massachusetts males have a significantly higher prevalence of diabetes compared to women, but this gender difference

is not seen among all races and ethnicities. For example, Hispanic and Black non-Hispanic women both have a higher prevalence of diabetes than men in the corresponding racial and ethnic groups (Figure 5).



People with disabilities have a greater likelihood of also reporting a diagnosis of diabetes (Figure 6). Decreased physical activity associated with some disabilities may contribute to overweight and obesity and thus the development of type 2 diabetes; on the other hand, complications from poorly managed diabetes may be the cause of the reported disability.



In addition, socioeconomic factors such as household income, educational achievement and type of health insurance have are significantly associated with changes in the prevalence of diabetes. People with less than a high school education, those with less than $25,000 annual household income and those who are on a public health insurance option are two to three times more likely to have diabetes compared to those with a college degree or higher, those who live in a household earning $75,000 or more and those with private health insurance, respectively.

Diabetes prevalence also varies by geography. The BRFSS surveys more people in certain large cities in Massachusetts (Springfield Lowell, Lawrence, Fall River, New Bedford, Boston, and Worcester) in order to increase the sample sizes for hard to reach demographic categories (e.g., Black and Hispanic adults). This "oversampling" also allows calculation of estimates that are specific to these geographic areas (see Table 1).

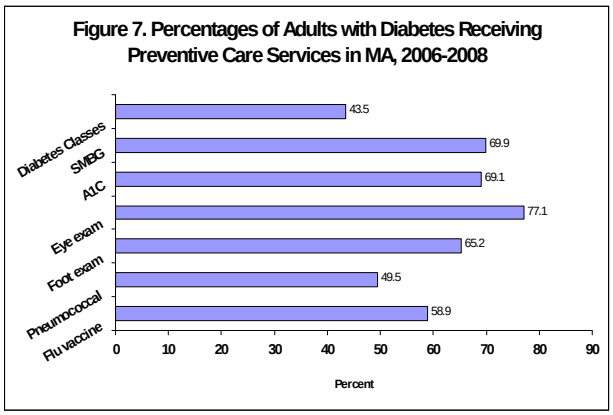
Table 1. Diabetes Prevalence (%) by Measures of Socioeconomic Status

Insurance Status	(%)
Uninsured	3.8
Private	3.4
MassHealth	8.2
Other	4.5
Educational Achievement	(%)
Less than HS	13.0
HS Graduate or GED	8.1
Some College	6.8
College Graduate or Higher	4.7
Household Income	(%)
<$25,000	11.6
$25,000 - $34,999	8.6
$35,000 - $49,999	7.5
$50,000 - $74,999	5.8
$75,000 or more	4.4
Selected Cities/Towns	(%)
Springfield	12.0
Lowell	9.7
Lawrence	13.0
Fall River	10.4
New Bedford	9.5
Boston	8.8
Worcester	8.3

PREVENTIVE CARE

In addition to maintaining a healthy weight, being physically active, and eating a nutritious diet, every person with diabetes can take additional steps towards good management of their condition. Foremost, people with diabetes should see their primary care physician to receive regular preventive care and education. Annual lower extremity exams that check for numbness will alert health care providers to individuals who have lost protective sensation in the feet and potentially prevent an amputation; annual dilated eye exams will prompt treatment for diabetic retinopathy which can delay or prevent blindness. Since people with diabetes are more vulnerable to the flu and pneumonia, they should also ask their provider about getting annual flu vaccinations as well as receiving a pneumococcal vaccination. In addition to checking one's own blood sugar levels (self-monitoring of blood glucose; SMBG), people with diabetes should ask their provider to order at least two A1c blood tests (also known as glycosylated or glycated hemoglobin) per year to see how well their blood sugar was controlled over the previous three months. Finally, diabetes self-management education (DSME) and medical nutrition therapy (MNT) can help people with diabetes to better manage their disease and prevent complications.

In Massachusetts, more patients with diabetes reported receiving preventive care services from their primary care physicians than for those in other states[9]. However, as shown in Figure 7, there is room for improvement.

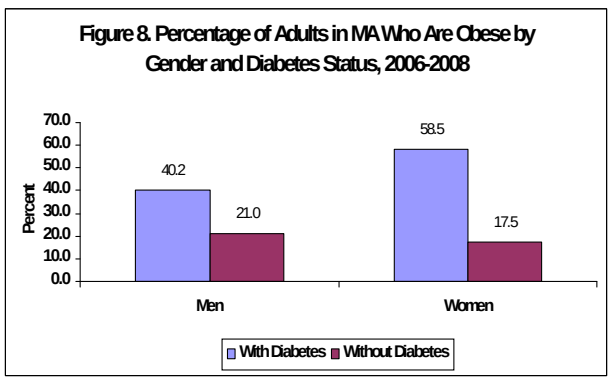


RISK FACTORS FOR TYPE 2 DIABETES

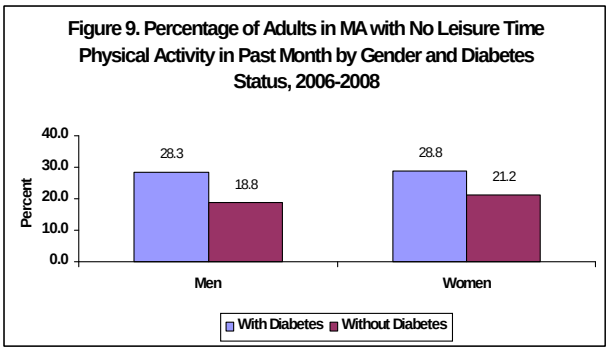
Note: Because men and women have different health outcomes, the results in this section are presented by gender. Type 2 diabetes occurs more often among people with certain characteristics or risk factors. For example, if someone is obese or overweight, has a family history of diabetes, is physically inactive, has poor nutrition, has pre-diabetes, is hypertensive, has high cholesterol or in the case of women, has a history of gestational diabetes, then his or her likelihood of developing type 2 diabetes is increased.

"High risk" individuals can prevent or delay the onset of type 2 diabetes with moderate weight loss through dietary changes and increased physical activity.

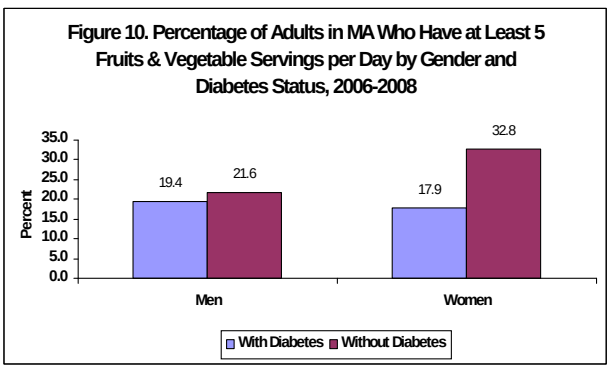
People with type 2 diabetes are much more likely to be obese. Obesity is twice as likely among men and three times more likely among women with diabetes (Figure 8).



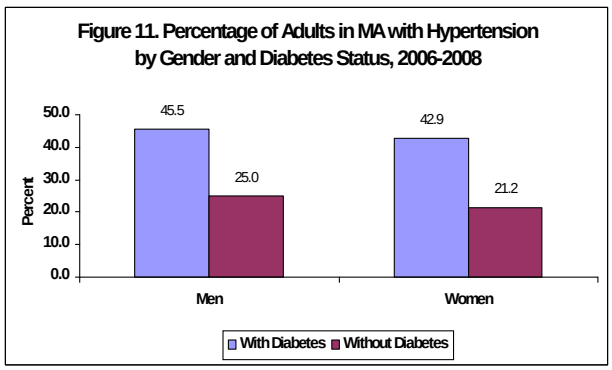
People with diabetes are more likely to report engaging in no leisure time physical activity (Figure 9).



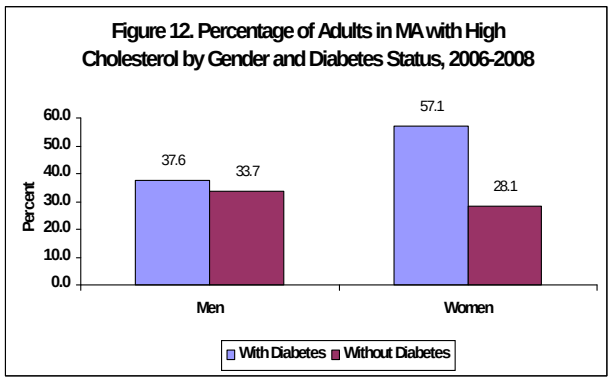
Only about half as many women with diabetes meet the guideline of eating at least five fruit and vegetable servings per day as compared to women without diabetes. The difference in fruit and vegetable consumption between men with and without diabetes is not significant (Figure 10).



Hypertension is present about twice as often among people with diabetes compared to those without diabetes (Figure 11). Among men with diabetes, nearly 46% have hypertension. Among men who do not have diabetes, 25% have hypertension. Among women with diabetes, nearly 43% have hypertension. Among women who do not have diabetes, 21% have hypertension.

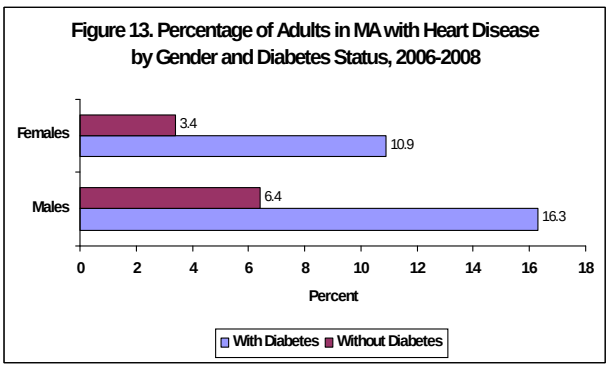


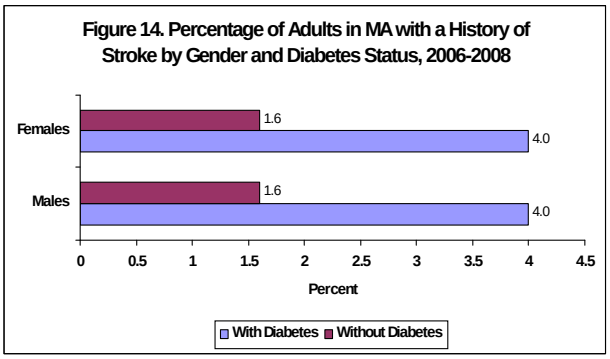
High cholesterol is reported in women with diabetes about twice as often as in women without diabetes. The difference in those reporting high cholesterol is not significant for men with and without diabetes (Figure 12).



RELATED CONDITIONS

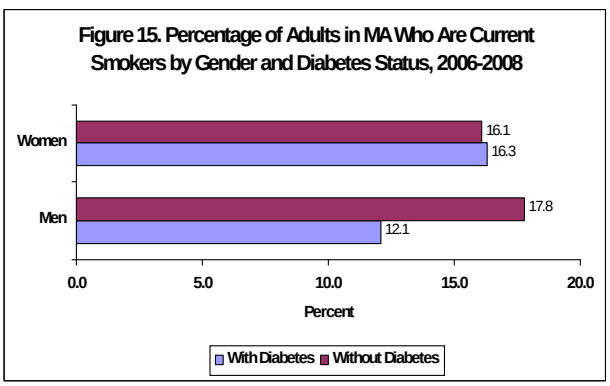
As previously mentioned, diabetes can cause serious health problems if it is not treated. This is because high blood sugar causes damage to the vessels that supply blood to vital organs. Consequently, people with diabetes have a greater likelihood of also having heart disease or stroke (Figures 13 and 14). Uncontrolled diabetes can also cause kidney disease, vision problems and nerve tissue damage which often progress to kidney failure, blindness and increased risk for amputations of the lower extremities.





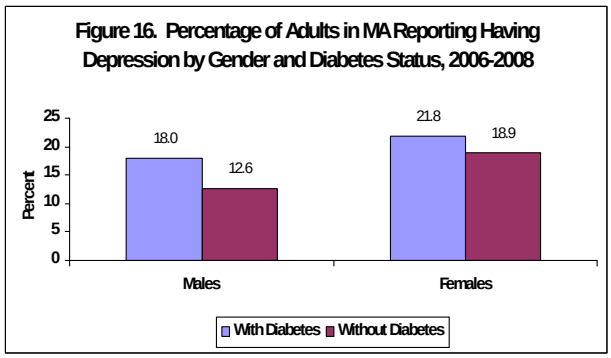
Fortunately, people with diabetes can avoid or delay these complications by maintaining normal blood sugar levels. Since tobacco use makes many of these complications more likely, it is especially important for people with diabetes to quit any tobacco use.

Unfortunately, current smoking rates among people with diabetes are similar to those who do not have diabetes, particularly among women (see Figure 15).



DIABETES AND DEPRESSION

Diabetes, like any serious chronic condition, can exert an emotional toll. In fact, an association exists between diabetes and depression (Figure 16) [10]. Depression can also affect a person's ability to manage their diabetes. If a person has multiple chronic conditions, such as diabetes and cardiovascular disease, it is recommended that their physician routinely screen them for depression[3].



CONCLUSION

Diabetes is a serious and growing problem. The prevalence of diabetes in Massachusetts almost doubled from 1990 to 2008. In addition, differences in the prevalence of diabetes exist across race/ethnicities, age groups, geographic areas and by gender, disability status, and socioeconomic status.

People at high risk for diabetes can reduce their likelihood of developing diabetes by addressing modifiable risk factors such as overweight or obesity and inactivity.

In addition, people with diabetes can reduce their likelihood of developing complications from diabetes by making sure they have good nutrition, are physically active and, if the conditions are present, improving their cholesterol levels, controlling their hypertension, and quitting smoking.

Unfortunately, people with diabetes in the Commonwealth often have a higher or similar prevalence of these characteristics compared to

people without diabetes. Without proper management, diabetes can lead to related complications, such as heart disease, stroke, kidney failure, blindness and lower extremity amputation.

Fortunately, many people with diabetes report that they receive regular preventive care (annual eye exams, annual foot exams, seasonal flu vaccine, pneumococcal vaccine, and at least two A1c blood tests each year) and have good self-management practices (such as self-monitoring of blood glucose). However, there is always room for improvement.

The prevention and control of diabetes requires an integrated approach. This means that as we move forward to address the burden from diabetes, all the risk factors and complications must be addressed as a whole. An integrated approach to address diabetes must also look at both the medical complexities of this disease along with the social and environmental impact on the people living with or at risk for diabetes.

Supporting healthy lifestyles and transforming social and environmental conditions can help prevent or delay the onset of diabetes and support those living with diabetes[11]. By taking a policy, systems and environmental approach to addressing diabetes prevention and control, sustainable changes can occur.

DATA NOTES

DATA SOURCE

All data presented are from the Behavioral Risk Factor Surveillance System (BRFSS), MA Department of Public Health

ABOUT BRFSS

The Behavioral Risk Factor Surveillance System (BRFSS) is a continuous, random–digit–dial, telephone survey of adults ages 18 and older and is conducted by all state departments of health in collaboration with the federal Centers for Disease Control and Prevention (CDC).

The survey has been conducted in Massachusetts since 1986. The BRFSS collects data on a variety of health risk factors, preventive behaviors, chronic conditions, and emerging public health issues. The information obtained in this survey assists in identifying the need for health interventions, monitoring the effectiveness of existing interventions and prevention programs, developing health policy and legislation, and measuring progress toward attaining state and national health objectives. Readers should be aware that all data collected by the BRFSS are based on self-reported information from respondents.

Self-reported data may be subject to error for several reasons: an individual may have difficulty remembering events that occurred a long time ago or the frequency of certain behaviors; some respondents may over-report socially desirable behaviors or under-report behaviors they perceive to be less acceptable; and respondents may also report certain risks, behaviors and perceptions differently due to their respective cultural and linguistic backgrounds. Additionally, because the BRFSS surveys a randomly selected sample of Massachusetts adults, these results may differ from another random sample to some extent simply due to chance.

METHODS

The BRFSS data are weighted to take into account differences in probabilities of selection due to the telephone number, the number of telephones in a household, and the number of adults in a household. Adjustments are also made to account for non-response and non-coverage of households without landline telephones. All the weighting factors are multiplied together to get the final weight for each respondent so that the weighted BRFSS data represents the adult population of Massachusetts.

Statistical significance (at the 95% probability level) was considered as a basis when the terms "more likely," "less likely," "about the same," "increase" or "decrease" were used. The difference between two percentages is statistically significant (with 95% probability) if the 95% confidence interval surrounding the two percentages does not overlap.

LIMITATIONS

Readers should be aware of some limitations of this data:

- The health characteristics estimated from the BRFSS pertain to the adult population, aged 18 years and older, who do not live in group quarters.
- BRFSS data are entirely self-reported. Diabetes status, or any other health status, was not confirmed through blood test or medical record review for any respondent.

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